

### REMARKS

The comments of the Applicant below are each preceded by related comments of the Examiner (in small, bold type).

**The declaration filed on 6 September 2005 is defective because all of the copies of the declaration do not list each inventor. In this instance, the copy of the oath signed by Khalid Sayood does not include the name of the third inventor, Steven H. Hinrichs. See MPEP 201.03 II B and MPEP 605.04(a) for rules governing the signatures and listing of inventors on oaths and declarations submitted for an invention.**

The applicant notes that the Declaration filed on September 6, 2006 has three pages, the names of all three inventors are listed on the first page, the names of Khalid Sayood and Hasan Otu are listed on the second page, and the name of Steven Hinrichs is listed on the third page. When the Declaration was presented to Khalid Sayood for signature, the names of all three inventors were present on the Declaration. Likewise, when the Declaration was presented to Hasan Otu and Steven Hinrichs for signature, the names of all three inventors were present on the Declaration. This is different from the situation described in the example provided in MPEP 201.03 (II)(B), in which the declaration executed by inventor A does not include inventor B, and the declaration executed by inventor B does not include inventor A.

**Claims 10, 18, and 22-23 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.**

**Claims 10, 18, and 22-23 are drawn to storage media for understanding and determining the presences of nucleotides within sequences, or determining distances between sequences of nucleotides within a bigger sequence.**

Claims 10, 18, and 23 have been amended.

Claim 22 is not drawn to storage media. Rather, claim 22 is a method claim.

**Claims 29 and 30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 29, it is unclear if it is the sum of the first and second numbers that is divided by the number of words OR if it is only the second number that is divided by the number of words that is needed to build the third nucleic acid sequence. For the purpose of examination, it is interpreted that the sum is divided by the number of words. In claim 30, it is unclear if it is the sum of the first and second numbers that is divided by the average of a third and fourth number of words OR if it is only the**

second number that is divided by the average. For the purpose of examination, it is interpreted that the sum is divided by the average.

Claims 29 and 30 have been canceled.

**35 U.S.C. 103 Rejection #1:**

Claims 1, 3-11, 15, 17-19, and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Varre et al. [Bioinformatics, volume 15, 1999, pages 194-202] in further view of Queen et al. [Nucleic Acids Research, Volume 12, 1984, pages 581-599]. Discussion of Independent claims 1, 10, 11, 18, 19, and 21-23:

...

The article of Varre et al. studies determining distances using a family of dissimilarity measures in oligonucleotide sequences [title]. ... Since every nucleotide of each sequence of Figure 1 of Varre et al. is stored in the database of Figure 1 of Varre et al., this database encompasses sets of nucleotides that are not within the first nucleic acid sequence. Furthermore, the entire list of sequences in Figure 1 of Varre et al. comprises the sum of each of the sequences. The bracketed subsequences of the sequences in Figure 1 of Varre et al. are interpreted to be "words" present in both sequences. Since the letters are "numbered" from a to k, there are a total of eleven words common to both sequences. The degree of common words between each of the sequences suggests the degree of difference or distance between the two sequences in Figure 1 of Varre et al.

However, the article of Varre et al. does not show summing, combining, and differencing of sequences by inserting and deleting subsequences into sequences as required in view of the interpretation of the indefiniteness rejection described above. Additionally, the article of Varre et al. does not teach the computer limitations of the rejected claims. The article of Queen et al. studies a comprehensive sequence analysis program for the IBM personal computer [title]. Specifically, Queen et al. uses an IBM personal computer to analyze biological sequences that include nucleic acid sequences [abstract]. In accomplishing this goal, the first paragraph on page 588 of Queen et al. describes deleting and inserting regions into sequences.

Claim 1

Varre does not describe and would not have made obvious "generating a dictionary of words based on the first nucleic acid sequence, ... if the first set of nucleotides does not match any word in the dictionary, storing the first set of nucleotides as a new word in the dictionary," as recited in amended claim 1.

Varre merely shows a source sequence S and a target sequence T in Fig. 1. What is missing in Varre is also not disclosed or suggested in Queen.

The applicant notes that Ono does not specifically discuss the use of dictionaries. Even if Ono does use dictionaries, the dictionaries used in Ono would have included English and Japanese words. There is nothing in Ono to suggest "combining said first and second nucleotide in sequence into a first set of nucleotides, ... if the first set of nucleotides does not match any

word in the dictionary, storing the first set of nucleotides as a new word in the dictionary,” as recited in claim 1.

Claim 1 is patentable for at least the above reasons.

Claims 10, 11, 18 and 19

Claims 10, 11, 18 and 19 are patentable for at least similar reasons as those applied to claim 1.

**Independent claim 22 is drawn to a method of determining the distance between two nucleic acid sequences. The method comprises determining the number of words in a first nucleic acid sequence. The method also comprises combining the first sequence with a second nucleic acid sequence to make a combined nucleic acid sequence. The method also comprises determining the number of words in the combined nucleic acid sequence. The method also comprises determining the difference between the number of words in the combined nucleic acid sequence and the first nucleic acid sequence to determine the distance between the first nucleic acid sequence and the second nucleic acid sequence.**

Claim 22

Queen does not describe and would not have made obvious “determining ... a number representing the difference between the number of words in the combined nucleic acid sequence and the first nucleic acid sequence to determine the distance between the first nucleic acid sequence and the second nucleic acid sequence,” as recited in amended claim 22.

Queen discloses deleting long regions of a sequence. The deletion of a portion of a sequence, as disclosed in Queen, is different from determining a number representing the difference between the number of words in the combined nucleic acid sequence and the first nucleic acid sequence, as recited in claim 22.

What is missing in Queen is also not disclosed or suggested in Varre.

Claim 22 is patentable for at least the above reasons.

Claim 23

Claim 23 is patentable for at least similar reasons as those applied to claim 22.

All of the dependent claims are patentable for at least the reasons for which the claims on which they depend are patentable.

Canceled claims have been canceled without prejudice.

Any circumstance in which the applicant has addressed certain comments of the examiner does not mean that the applicant concedes other comments of the examiner. Any circumstance in which the applicant has made arguments for the patentability of some claims does not mean that there are not other good reasons for patentability of those claims and other claims. Any circumstance in which the applicant has amended or canceled a claim does not mean that the applicant concedes any of the examiner's positions with respect to that claim or other claims.

The Petition for Three-Month Extension of Time, Request for Continued Examination, and excess claim fees in the amount of \$1070 are being paid concurrently herewith on the Electronic Filing System (EFS) by way of deposit account authorization. Please apply all charges or credits to deposit account 06-1050, referencing attorney docket 24742-0017US1.

Respectfully submitted,

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